# Appraising Design


A Monograph


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2016

# REPORT DOCUMENTATION PAGE

| 1. REPORT DATE (DD-MM-YYYY) | 2. REPORT TYPE | 3. DATES COVERED (From - To) |
|---|---|---|
| 02-03-2016 | SAMS Monograph | JUN 2015 - MAY 2016 |

**4. TITLE AND SUBTITLE**

Appraising Design

**5a. CONTRACT NUMBER**

**5b. GRANT NUMBER**

**5c. PROGRAM ELEMENT NUMBER**

**6. AUTHOR(S)**

MAJ Donald J. Nunemaker

**5d. PROJECT NUMBER**

**5e. TASK NUMBER**

**5f. WORK UNIT NUMBER**

**7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES)**

US Army Command and General Staff College
ATTN: ATZL-SWD-GD
Fort Leavenworth, KS 66027-2301

**8. PERFORMING ORGANIZATION REPORT NUMBER**

**9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)**

School of Advanced Military Studies

**10. SPONSOR/MONITOR'S ACRONYM(S)**

**11. SPONSOR/MONITOR'S REPORT NUMBER(S)**

**12. DISTRIBUTION/AVAILABILITY STATEMENT**

Approved for public release; Distribution is unlimited.

**13. SUPPLEMENTARY NOTES**

**14. ABSTRACT**

In the context of military operations, ideas about design developed over the past fifteen years to create a process to gain deeper understanding to inform conceptual planning. While all offer a holistic understanding of a given environment and problem to focus military efforts, each provides a different way to develop this understanding. Army Design Methodology and Operational Design require a series of frames that result in a broad operational approach. Systemic Operational Design requires a discourse involving seven steps organized into two major components termed system framing and operational framing. There are several criteria that one can use in order to evaluate these methodologies. Using the variables of command, logistics, intelligence, culture, and communications, one can evaluate each of these methodologies to judge which offers advantages and in what context.

**15. SUBJECT TERMS**

Operational Art, Operational Design, Army Design Methodology, Systemic Operational Design, Second Lebanon War, Operation Odyssey Dawn, Mao Tse-Tung

| 16. SECURITY CLASSIFICATION OF: | | | 17. LIMITATION OF ABSTRACT | 18. NUMBER OF PAGES | 19a. NAME OF RESPONSIBLE PERSON |
|---|---|---|---|---|---|
| a. REPORT | b. ABSTRACT | c. THIS PAGE | | | MAJ Donald J. Nunemaker |
| (U) | (U) | (U) | (U) | 47 | 19b. TELEPHONE NUMBER (Include area code) 9137583282 |

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Monograph Approval Page

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**Abstract**

Appraising Design, by MAJ Donald J. Nunemaker, United States Army, 47 pages.

In the context of military operations, ideas about design developed over the past fifteen years to create a process to gain deeper understanding to inform conceptual planning. While all offer a holistic understanding of a given environment and problem to focus military efforts, each offers a different way to develop this understanding. Army Design Methodology and Operational Design require a series of frames that result in a broad operational approach. Systemic Operational Design requires a discourse involving seven steps organized into two major components termed system framing and operational framing. There are several criteria that one can use in order to evaluate these methodologies. A methodology's ability to better facilitate command in an uncertain environment is critical. Likewise, logistics systems should be able to bring material to the mission in sufficient quantities to support success. Intelligence should be sufficiently flexible to allow for uncertainty about the enemy and still provide sufficient data about the enemy. A military's culture may make one methodology preferable to another. Finally, one's ability to communicate one's ideas and intent easily in a common and easily understood language is also a strength. Using the variables of command, logistics, intelligence, culture, and communications, one can evaluate each of these methodologies to judge which offers advantages and in what context.

# Contents

**Acronyms**

| | |
|---|---|
| ADM | Army Design Methodology |
| AFRICOM | Africa Command |
| CAS | Complex Adaptive System |
| COCOM | Combatant Command |
| EBO | Effects Based Operations |
| EUCOM | European Command |
| HA | Humanitarian Assistance |
| IAF | Israeli Airforce |
| IDF | Israel Defense Forces |
| JTF | Joint Task Force |
| JOPP | Joint Operations Planning Process |
| NATO | North Atlantic Treaty Organization |
| NEO | Noncombatant Evacuation Operation |
| NVD | Night Vision Device |
| NTC | National Transition Council |
| OD | Operational Design |
| OOD | Operation Odyssey Dawn |
| OTRI | Operational Theory and Research Institute |
| PGM | Precision-Guided Munition |
| PLO | Palestinian Liberation Organization |
| RMA | Revolution in Military Affairs |
| SOD | Systemic Operational Design |
| TRANSCOM | Transportation Command |

UNSC                    United Nations Security Council

UNSCR                   United Nations Security Council Resolution

**Introduction**

"When one does anything, unless one knows the actual circumstances, its nature and relations to other things, one will not know the laws governing it or know how to do it well."

— *Mao Tse-Tung*

During the Second Intifada in April 2002, Israeli Defense Force (IDF) soldiers laid siege to the city of Nablus, West Bank. Though it started as a typical operation, by the end it was anything but typical. Using completely new tactics, the IDF applied a concept called inverse geometry that reinterpreted the urban architecture of the city. Rather than using streets and alleys to advance their forces, the IDF used the interior of buildings to maneuver their forces through the city using a swarm strategy.[1] Though the IDF gained a tactical success, the implications of such tactics brought warfare directly into the domain of civilian life, humiliated the city's occupants, and severely traumatized the sufferers of the attacks. The IDF locked civilians into rooms of their homes without access to the necessities of life, sometimes for several days.[2] The root of these tactics grew from a new methodology for conceptualizing military operations inspired by a term called "design."

What is Design?

Design, in the context of military operations, is a "methodology for applying critical and creative thinking to understand, visualize, and describe complex and ill-structured problems and develop approaches to solve them."[3] Though design takes its inspiration in part from architectural theory, the idea is to apply a methodology to a given problem and develop a better understanding.

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[1] Eyal Weizman, "Lethal Theory," Open! Platform for Art, Culture & the Public Domain, November 1, 2009, accessed January 28, 2016, www.onlineopen.org/lethal-theory.

[2] Weizman, accessed January 28, 2016, www.onlineopen.org/lethal-theory.

[3] Alex Ryan et al., *Art of Design Student Text Version 2.0* (US Army Command and General Staff College, 2010), 16.

There are several methodologies that military organizations use to understand the context of a problem before conducting operations. Each seeks to gain a better understanding of a problem and use it to inform detailed planning. I have collectively termed these methodologies "design" when referring to them collectively in this monograph.

The US Army currently employs the Army Design Methodology (ADM). This involves framing the operational environment, framing problems, framing solutions, and reframing when necessary based on changes in the environment.[4] Other methodologies seek a similar understanding of a problem even if they differ in their approaches. Systemic Operational Design (SOD) developed by Israel's Operational Theory Research Institute (OTRI), involves a series of seven discourses divided into two major activities entitled system framing and operation framing.[5] Another method used, perhaps anachronistically, was Mao's idea of understanding an environment fully within its context and familiarizing "oneself with all aspects of the enemy" with a focus on learning.[6]

Each methodology seeks a deeper understanding that informs conceptual planning. This understanding, in turn, informs detailed planning. While each offers a holistic understanding of a given environment and problem, they emphasize a different way to develop this understanding. Army Design Methodology and Operational Design offer a marked advantage over Systemic Operational Design based on their superior flexibility of command, intelligence system, and ability to communicate.

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[4] Army Techniques Publication (ATP) 5-0.1, *Army Design Methodology* (Washington, DC: Government Printing Office, 2015), 1-4.

[5] Lieutenant Colonel William T. Sorrells et al., "*Systemic Operational Design: An Introduction*" (monograph US Army Command and General Staff College, 2005), 23.

[6] Mao Tse-Tung, *Selected Writings of Mao Tse-Tung* (Peking, China: Foreign Language Press, 1967), 84.

Why is a Design Appraisal Important?

The US military spent the years from approximately 2005 to 2011 refining ADM. Though ADM is part of doctrine, planners unfamiliar with assumptions and key ideas may misuse the methodology. In order to properly apply ADM, one must be familiar with operational art, critical and creative thinking, collaboration and dialogue, systems thinking, framing, visual modeling, and narrative construction.[7] Though not overly complicated in and of themselves, these ideas seem to require a measure of advanced education to use effectively. This education is not a normal part of a US military officer's professional development.

The required education is even more pronounced when one considers the use of ADM's forerunner, SOD. While learning to apply SOD in a US practical training exercise in 2005, participants concluded that it required "the application of a different mindset of epistemological approach within the military as an institution."[8] Such complicated language pervades SOD. It also challenges one's fundamental understanding of military operations and thinking. Additionally, training and education for SOD required something beyond the standard military education program for field grade officers.[9] In essence, this methodology required a paradigm shift in the way that the military establishment understood its operations, thinking, and training at the operational level.

Finally, when one considers Mao and his ultimate success against the Kuomintang, one wonders whether more modern methodologies are overly complicated. Though they had neither specialized education nor the intellectual background for applying more complicated methodologies like ADM or SOD, the Red Army was still ultimately successful against a far superior foe. Mao's understanding of his own operational problem and the learning necessary to

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[7] ATP 5-0.1, 1-5.

[8] Sorrells et al., 20.

[9] Sorrells et al., 39.

gain that understanding involved a design-like process. Additionally, he was able to communicate his solution to his subordinates in a way that was not overly complicated, nor required a fundamental shift in the way the Red Army conducted its operations. This outcome suggests that communication is a key to the utility of any preferred methodology despite the insular understanding of those at the top.

This monograph will explore the following questions: Are ADM or SOD simply overly-complicated methods identified by Mao eighty years ago? Is Maoist thought too simple in the modern context? Though it was ultimately rejected by the IDF and the US Army, does SOD have nothing to provide in terms of utility for use in the military? Is ADM "good enough" for the US Army? Are there contextual circumstances that offer an advantage of one methodology over another? How do the US Army's Effects Based Operations (EBO) and Net-Centric Warfare (NCW) fit into this discussion?

Structure of the Monograph

The purpose of this monograph is to determine which design methodology provides an advantage to military planning and under what circumstances. First, it will review recent literature to provide a basic understanding of the three methodologies under scrutiny. Then it will describe the evaluation criteria applied to each methodology. The measures selected for this study will evaluate command, logistics, intelligence, culture, and communication. It will then evaluate the merits of each methodology using two qualitative case studies. The context of the first case study is the Second Lebanon War during 2006 and that of the second case study is Operation Odyssey Dawn in February and March 2011. It will then conclude its analysis by comparing the results of the evaluation criteria applied to ADM and SOD. At a minimum, this monograph seeks to encourage an academic dialogue by adding to the literature of understanding design frameworks. By doing so, others may be able to help answer the question, "What is the best

methodology to use to understand an operational environment and what circumstances make it so?"

## Literature Review

Argument

      This chapter presents a summary of three methodologies as an aid to understanding design's background. Military professionals and strategists use different forms of design to understand a problem. However, there seems to be little discussion on how to evaluate such frameworks in general. Currently, the US Army uses ADM to understand an unfamiliar environment and define a specific problem to solve before detailed planning occurs. However, is ADM the best way to set the conditions for detailed planning? Are there circumstances that would be better suited to using one design framework over another? What measures should we use to determine such a framework? This monograph argues that any design methodology should be able to positively affect detailed planning through an evolutionary interaction involving design, planning, and operations. The variables of command, intelligence, logistics, culture, and communication were chosen to evaluate each methodology.

Other Academic Work

Army Design Methodology and Operational Design

      Army Design Methodology and Operational Design are the primary ways that US commanders and staffs understand an operational problem under scrutiny as a primer for conceptual planning. ADM is a US Army-centric methodology and consists of three activities named framing the environment, framing the problem, and reframing the design when necessary.[10] Each of these activities is intended to assist a commander and staff gain

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    [10] ATP 5-0.1, 1-5.

understanding of a situation before detailed planning occurs. It also iteratively reframes the problem as necessary to account for changes in the environment concurrent with planning and operations. Operational Design (OD) is used at the US Joint level and is used for the conceptual planning that informs detailed planning during the Joint Operations Planning Process (JOPP). Similar to ADM's methodology, OD is used to understand the strategic direction, understand the operational environment, define the problem, and reevaluate a situation based on one's assessment and learning.[11] The final product of both of these methodologies is an operational approach.

To be applied correctly, ADM requires a familiarity with the concepts of operational art, critical and creative thinking, collaboration and dialogue, systems thinking, framing, visual modeling, and narrative construction.[12] OD also uses systems theory to underpin its methodology.[13] Both ADM and OD require a specific type of system called a complex adaptive system (CAS). A CAS involves aggregates of agents within a system that adapt to each other in a co-evolutionary process.[14] Such systems manifest emergent properties that are inseparable from the system as a whole.[15] Without understanding the background for applying ADM, there is a risk that it will be utilized mechanistically as other doctrinal concepts typically are. At this point, it loses its creative nature and becomes less useful toward helping planners understand the problem and develop solutions for it in an iterative manner. Many aspects of ADM and OD seem to be influenced by an older design methodology called SOD.

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[11] Joint Publication (JP) 5-0, *Joint Operation Planning* (Washington DC: Government Printing Office, 2011) III-7, III-44.

[12] ATP 5-0.1, 1-5.

[13] JP 5-0, III-7, III-10.

[14] Robert Axelrod and Michael D. Cohen, *Harnessing Complexity* (New York: Basic Books, 2000), 8.

[15] Axelrod and Cohen, 15.

Systemic Operational Design

Shimon Naveh, of OTRI, developed SOD in 1995.[16] Systemic Operational Design

developed as the solution to perceived poor IDF performance during the Yom Kippur War in

1973. Though they arguably gained tactical success at the end of the conflict, the IDF believed

that this tactical success merely ameliorated an operational failure. The difference between

Israel's previous success against its Arab neighbors and its current failure was that it rejected its

original strategy of the preemptive strike. That is, once intelligence provided sufficient warning,

the IDF would attack potential threats.[17] During the Yom Kippur War, the solution was to

mechanistically apply what had been tactically successful in the past without using preemptive

strikes. In this case, the IDF sent armored formations to conduct attrition warfare and occupy

enemy territory. This distinction suggested a lack of operational thought within the IDF.[18]

Reinforcing this dynamic was a second perceived failure at the start of the First Lebanon War in

the early 1980s. The IDF again used massed armor formations to seize territory and defeat an

enemy through attrition.[19] Though tactically successful, the IDF occupied southern Lebanon and

remained until 2000.[20]

During this timeframe, there was much tactical effort expended with little strategic

result.[21] Based on its earlier experience in the 1970s and 1980s, the IDF reframed its conception

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[16] Sorrells et al., 7-8.

[17] John R. Billmyer, "The IDF: Tactical Success – Strategic Failure, SOD, the Second Intifada and Beyond" (monograph US Army Command and General Staff College, 2011), 53.

[18] Shimon Naveh, *Operational Art and the IDF: A Critical Study of a Command Culture* (Washington DC: Center for Strategic and Budgetary Assessment, 2007), 74-5.

[19] Naveh, 75.

[20] Matt M. Matthews, *We Were Caught Unprepared: The 2006 Hezbollah-Israeli War* (Fort Leavenworth, KS: Combat Studies Institute Press, 2008), 11.

[21] Naveh, 75.

of operational art based on systems thinking and pragmatic utilization. It rejected Clausewitzian thought because it was too linear in nature.[22] Rather, the IDF adopted disciplines including systems of learning, culture, command, organization and logistics, and maneuver.[23] Combining concepts from post-modernist thought and Soviet operational art from the 1930s, the methodology's primary goal was to shock an enemy system through the Soviet concept "udar."[24] The Israelis reframed their military logic from using mobile linear formations to using operations to affect the enemy's cognitive domain. This was not so much a methodology for victory, but a methodology to shape the environment to one's advantage.[25] The IDF employed this methodology for the first time during the Second Intifada.

Systemic Operational Design starts with the premise that one should think about the nature of the problem rather than what the problem actually is.[26] Its goal is to identify the underlying influences making the system behave the way it does. Systemic Operational Design is broken down into seven steps organized into two major components termed "system framing" and "operational framing." System framing rationalizes strategic factors and relates them to the current operational environment. Within system framing, the next three steps analyze a system's logic generally at the strategic level. These are "rival as rationale," "command as rationale," and "logistics as rationale."[27] Systemic Operational Design practitioners analyze each of these three frames in detail using a comprehensive discourse. What results is a system frame that operates generally at the strategic level and informs the next three steps at the operational level.

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[22] Billmyer, 59.

[23] Naveh, 84.

[24] Billmyer, 59.

[25] Billmyer, 62-3.

[26] Sorrells et al., 15.

[27] Sorrells et al., 23.

The next major component of SOD is termed "operational framing" and involves conceptualizing an operation by exploiting the tensions within a system and sets conditions for organizational learning. Like system framing, it is broken down into a series of two steps termed "operational effects" and "forms of function." Operational effects seek to achieve ending conditions by discovering the form and procedures necessary to exploit the tensions identified in the systems framing step. By understanding these tensions, the organization learns from an operational effect by a reframe that reconsiders the original dialogue.[28]

The final step, forms of function, provides the substance to the operational design and establishes the specifics of each action. It brings the detailed planners into design to establish a form for each effect.[29] This is probably one of the most significant steps in SOD because of the nature of the complicated vocabulary involved with SOD. The risk associated with ADM concerning the misuse of methodology without the educational background is even more pronounced when one applies SOD. SOD's concepts are largely based on complicated vocabulary and complex concepts based on architectural theory and postmodernist thought.[30] Despite the difficulty translating these ideas into more appropriate military concepts, one should not dismiss SOD completely. Given sufficient education for both designers and planners along with the time to translate the communicated ideas, SOD seems to be effective. However, without such a dialogue between SOD practitioners and military planners, the form that military operations takes can be radically different from the system frames intended. Such difficulty may have occurred in the Second Lebanon War.

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[28] Sorrells et al., 26-27.

[29] Sorrells et al., 28.

[30] Weizman, accessed January 28, 2016, www.onlineopen.org/lethal-theory.

Like ADM, SOD avoids prescriptive methodologies in its application and assumes that any bounding is an artificial construct by the operational artist as an aid to understanding.[31] Though it has been criticized as too detailed and too time intensive to use effectively, SOD still contains useful ideas about combating an evolving and thinking enemy. Given a problem with no easy military solution, such as a protracted war, SOD offers useful ideas about how to combat non-state actors when a full military invasion is unacceptable politically. Systemic Operational Design offers planners a possible solution to a problem bounded by a long time frame and with the means to gain the intelligence required.

Maoist Thought: An Additional Method?

To demonstrate the universality of design, Mao offers a third methodology to understand a problem. Mao discussed the problem of applying the rules of war mechanistically to a given environment in his book *Problems of Strategy in China's Revolutionary War*.[32] He recounted the process of using a general theory to inform one's understanding and then apply specific rules to a particular situation. In this case, the situation was the Communist fight against the Chinese Nationalists. Mao described a process that resonated with ADM. In his narration, he began by discussing the general rules of war, then progressed to the general rules of revolutionary war, and finally the particular rules of China's Revolutionary War based on the context of his situation.[33] Mao further advocated learning about the nature of the situation despite the difficulty of doing so. Specifically he directs his pupils to familiarize themselves with all aspects of the enemy, discover the laws governing both sides, and make use of the laws of war in their own operations.[34] Mao

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[31] Sorrells et al, 17.

[32] Mao, 79.

[33] Mao, 77.

[34] Mao, 85.

also included a discussion that resonated with reframing in ADM. "The process of knowing a situation does not just occur before the formulation of a military plan, but also after."[35] This "knowing of a situation" is what any military force is trying to achieve regardless of the methodology used. This understanding and opportunity for learning resonated with ADM's environmental framing, problem framing, and reframing. However, others misapplied Mao's methods in the past. Though these ideas are simple, they are not simplistic and are difficult to understand perfectly. Misapplying Mao's ideas prescriptively and out of context can be a disaster. Though Mao developed a deep understanding and could apply the specifics of his methodology to his own situation, the examples of Angola, Cambodia, Peru, and the Philippines present examples of his methodology's failure.[36] Though Mao accounts for this in his ideas of learning about the general and specific laws of a situation, others have used his methods imperfectly.

Though it may seem too simple to be effective, Mao's method is congruent with both ADM and SOD to qualify as a third methodology. The more effectively one can gain understanding, the less time one will waste trying to adhere to more complicated methodologies. Though simple, Maoist thought is not simplistic and when applied could be superior over other design methodologies given a minimal amount of time, and little academic understanding of the theory needed behind such methodologies.

Theory

Given the similarities in terms of function and intent behind the three design methodologies, comparing them would assist designers and operational artists in selecting the most effective method given the circumstances at hand. Though each allows for innovation and

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[35] Mao, 86.

[36] Anthony James Joes, *Resisting Rebellion: The History and Politics of Counterinsurgency* (Lexington, KY: The University of Kentucky, 2004), 207.

infers universality in its application, there are cultural conditions that may be more compelling for one methodology to flourish over another.

Five criteria serve as independent variables to analyze design methodologies. The first three criteria were inspired by SOD's system framing step that seeks to understand a systems command, enemy, and logistics. These three frames offer a comprehensive look at many of the system variables (universality) of a particular problem. The fourth criterion is culture. The preference for and successful implementation of one methodology over another could be determined by the military culture of the given organization. The last criteria is communication. If one cannot effectively communicate to one's subordinate units what one wishes to do, or if the communicated message is misinterpreted, then the form that the operation takes may be at best misused and at worst courts disaster. Collectively, these seem to be a necessary factors to consider before any new design methodology is preferred by an organization. One final note is that even though an organization can adopt a methodology and use it appropriately, it can still select the wrong solution to a given problem. A detailed description of each of the criteria is below.

Command

Martin van Creveld evaluates command through a historical lens is his book *Command in War*. He argues that command has become progressively more difficult to execute due to changes in the nature of command itself. The changes result in the interaction between increasing demands and new technology, the introduction of new weapons systems, the preference of making changes inside command systems, and the increase in costs arising from the previous

factors.[37] As a corollary, the role of command increases in importance with the level of sophistication of the forces involved.[38]

Given the above factors, van Creveld argues that the ideal command system gathers information accurately, continuously, comprehensively, selectively, and fast. Furthermore, it develops reliable means to accurately evaluate information and display it in a clear, detailed, and comprehensive manner. Such a system allows the command to account for the confusing nature of war.[39] Such complexities and vague strategic guidance inherent in modern operations necessitates this feature of command.[40] He concludes that no single master command principle exists in the forms of organizations, procedures, or technical means and that successful command at one time and place will not guarantee success at another. More fundamentally, command's principles are different when dealing with an insurgency where psychological and political factors are more important.[41]

Van Creveld also identifies a paradox that arises when seeking certainty using command systems. Certainty is the product of the amount of information available for decision-making and the nature of the task to be performed. Larger and more complex tasks correspond to a greater information requirement to obtain greater certainty.[42] Perfect certainty is impossible no matter what technological means are available. Assuming that command systems are able to achieve

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[37] Martin van Creveld, *Command in War* (Cambridge, MA: Harvard University Press, 1985), 1.

[38] van Creveld, *Command in War,* 6.

[39] van Creveld, *Command in War,* 8.

[40] Gregory K. James, Larry Holcomb, and Chad T. Manske, "Joint Task Force Odyssey Dawn: A Model for Joint Experience, Training, and Education," *Joint Forces Quarterly*, issue 64, (2nd Quarter 2012): 26.

[41] van Creveld, *Command in War*, 261-262.

[42] van Creveld, *Command in War,* 268.

certainty is dangerous. Therefore, the best measure of command's effectiveness is its ability to

deal with uncertainty and still make use of the information and resources available to accomplish

the mission.[43] The idea that certainty-seeking systems become an end in themselves rather than

the means can easily devolve to analytical paralysis. As a criterion for evaluating design

methodologies, command enables the commander to make key decisions at the proper time and

place with the information available. If a methodology relies on something akin to perfect clarity

or superiority in information, then it is less effective. The more occurrences that a command

system can successfully deal with uncertainty, the more utility it has.

Logistics

As a larger concept, logistics encompasses functions such as supply, distribution,

personnel services, and finance. The form that logistics takes greatly impacts the effectiveness of

military activities. Van Creveld identified a methodology for evaluating logistics in war that he

defined as the practical art of moving armies and keeping them supplied.[44] Like command, the

more complex a system becomes, the more resources are required to maintain it effectively.[45]

This is compounded when coordinating logistics across a coalition.[46] A specific discontinuity

regarding logistics seems to be the transition from the practice of irregular to regular warfare.

Though a conventional force is required to ultimately achieve victory, the transition to such a

force is a time of weakness for a given regular force if executed prematurely. Such a weakness

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[43] van Creveld, *Command in War*, 263, 268.

[44] Martin van Creveld, *Supplying War* (Cambridge, UK: Cambridge University Press, 2004), 1.

[45] van Creveld, *Supplying War,* 236.

[46] W.A. Brown and Brent Coryell, "Logistics Support Seams During Operation Odyssey Dawn and Unified Protector," *Joint Forces Quarterly*, issue 68, (1st Quarter 2013): 77.

existed when moving from Phase II to Phase III of Mao's theory of protracted war, and partially

explains the Greek Communists' defeat in 1949.[47] [48]

More than other evaluation criteria, logistics is the essence of gaining the physical means

to achieve one's objectives. It acts as a lubricant for the machinery of the organization and is only

as effective as its ability to set the conditions for the organization to do its job. As a criterion,

logistics should be evaluated based on its ability to bring resources to bear on a given mission.[49]

Though required for operational success, logistics is insufficient to achieve victory by itself. If a

methodology relies too heavily on impeding the flexible use of logistics, then it is a weak

methodology. The more occurrences that a logistics system fails to provide resources to a

situation, the less utility it has.


Intelligence

This criterion specifically refers to intelligence about enemy forces and roughly

corresponds to SOD's aim of understanding the enemy in the "rival as rationale" framework.[50]

Intelligence is important because it sets the conditions to surprise the enemy. There is a congruent

relationship between intelligence and command: intelligence feeds the command system and

informs decision-making. However, evaluating a methodology's ability to effectively use

intelligence is difficult. John Keegan offers that the intelligence process has five fundamental

stages termed acquisition, delivery, acceptance, interpretation, and implementation.[51]

Furthermore, one can never achieve perfect or pure intelligence. One can never know everything

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[47] Mao, 210-11.

[48] Charles R. Shrader, *The Withered Vine: Logistics and the Communist Insurgency in Greece*, 1945-1949 (Westport, CT: Praeger, 1999), 257.

[49] van Creveld, *Supplying War*, 235.

[50] Sorrells et al., 23.

[51] John Keegan, *Intelligence in War* (New York: Vintage Books, 2004), 5-6.

about the enemy's intentions, capabilities, and plan of action, nor the enemy's failure to understand the same about one's own information. Additionally, the enemy must not understand that he has been compromised.[52] This ideal is an impossibility in practice.

All intelligence is imperfect by its nature. It is altered by changing events on the ground and generally becomes less lucrative the longer it takes to act on.[53] This dynamic is further complicated by the paradox that the more data one collects on a phenomena, the longer it takes to process it. This resonates with the command variable discussed earlier. The ability to communicate quickly and securely is at the heart of intelligence in real-time practice. Similar to logistics, intelligence is necessary, but not sufficient to achieve victory. The decision in war is always the result of military action, and willpower always counts for more than knowledge.[54] Unlike command, the intelligence criterion focuses outward on the enemy. This nuance is important because the amount of uncertainty about an enemy's forces should be greater than that of one's own forces. To be effective, a methodology must use intelligence based on its ability to deal with uncertainty about the enemy. The more a methodology relies on certainty in intelligence gathering, the weaker it is. The more occurrences that an intelligence system is able to deal with uncertainty about the enemy, the more utility it has.

Culture

Another criteria to evaluate a methodology is military culture. According to Dima Adamsky, some cultures are better at integrating new ideas and concepts than others. Though his study focused on technology integration, Adamsky's logic can also apply to methodology preferences. He stated that military organizations require both access to new technology (or ideas)

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[52] Keegan, 324.

[53] Keegan, 6.

[54] Keegan, 25.

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and the ability to restructure concepts and organizations to integrate that new technology. This latter ability is dependent on social and cultural factors.[55] Successfully adopting concepts from a revolution in military affairs (RMA) require not only advances in technology, but also the confluence of weaponry, concept of operations, organization, and the vision of future war.[56] Adamsky argued that military cultures that are more predisposed to holistic and dialectical thinking are more likely to recognize the emergence of a revolution in military affairs. Though he specifically addressed RMAs, holistic thinking is a key idea of systems thinking mentioned previously in ADM. How effective a particular military can implement each of these methodologies may depend on their cultural preference for seeing things holistically. Holistic and dialectical thinking approaches are better suited for understanding emergent changes in the underlying relationships of a system than analytical and logical ones.[57] Cultures that are holistic and dialectical in their thinking are more likely to effectively use these design methodologies.

Communication

Communication, the final criterion, includes more than transferring tactical information. Communication is the idea of socializing a concept within an organization through education and learning. It is best measured when the communicated concepts are applied in a real world scenario and result in the methodology's proper use. This is a key criteria because each of the methodologies has issues with respect to communication.

For ADM, there is a section in Army Techniques Publication (ATP) 5-0.1 *Army Design Methodology* that describes key concepts that one must understand to use ADM effectively. The

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[55] Dima Adamsky, *The Culture of Military Innovation* (Stanford, CA: Stanford University Press, 2010), 7.

[56] Adamsky, 1.

[57] Adamsky, 19, 21.

publication describes ADM as an interdisciplinary approach to planning and solving problems that includes military theory, writings on the nature of problems, and the challenges of critical and creative thinking.[58] Not all of these concepts are part of a typical US military education and it is necessary to translate such concepts into something that planners can use.

For SOD, communication becomes even more difficult. Learning about SOD often created discomfort for those who learn it because of its seemingly complex nature and dramatically different form compared to other planning systems. The detailed and descriptive language is not conducive to quick understanding. Like ADM, SOD requires additional education and assumes the practitioner has knowledge of general systems theory (GST) and philosophy.[59] The unfamiliar language of SOD, though useful if understood, springs from architecture theory and post-modernist thought that is difficult to teach and socialize to the larger US officer corps.[60] This difficulty is not only with the concepts themselves but with the confusion that can result in translating concepts to action. SOD's credibility may be undermined despite proper instruction because it is so easily misapplied. Though there is much to be gained from an understanding of SOD, a key weakness is the difficulty of communicating it.

Though Mao's thought on framing an operational context was simple, he too had to overcome the difficulty of communicating his intent to his subordinates. After developing what ADM would call its environmental and problem frame, he became frustrated at the misinterpretation of his orders and the counterproductive ideas that emerged within the Communist Party and Red Army. Mao's solution was through education to ensure clarity down to the lowest levels.[61] This education and reeducation was key to correcting the misunderstanding or

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[58] ATP 5-0.1, 1-5.

[59] Sorrells et al., 29.

[60] Weizman, accessed 28 January, 2016, www.onlineopen.org/lethal-theory.

[61] Mao, 62.

ignorance of Chinese Communist thought in its application. He relied on instructions at the strategic level rather than local directives. This centralized strategic command provided planning and direction of guerilla warfare as a whole by the state, rather than decentralized guerilla warfare where local command could lead to contradictions internal to the Communist forces.[62] As opposed to other methodologies, Maoist thought did not require a background in any modern concepts now applied to ADM or SOD. Rather it required in-depth thinking about the situation at hand and the ability to communicate that frame to the lowest level. The fewer occurrences that a system has of poor communication, the more utility it possesses.

Summary

Though each methodology has strengths and weaknesses, there has not been a method to evaluate each to determine its suitability based on the context of a given situation. Command measures the ability of an organization to deal with uncertainty. Logistics measures the ability of a command to generate resources at the appropriate time and place. Intelligence measures the ability of the organization to understand the enemy. Culture measures the preference of one methodology over another and communication measures the organization's effectiveness at translating key ideas to inform the detailed planning process. The variables of command, logistics, intelligence, culture, and communication offer a way to evaluate one methodology's use over another based on the situation at hand.

Hypothesis

Each methodology attempts to gain a deeper understanding to inform conceptual planning. This understanding, in turn, informs detailed planning. While each offers a holistic understanding of a given environment and problem, they provide a different way to develop this

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[62] Mao, 184.

understanding. Army Design Methodology and Operational Design offer a marked advantage to Systemic Operational Design based on their flexibility of command, superior intelligence system, and ability to communicate.

## Methodology

Qualitative Case Study

I chose two different, yet contemporary case studies that could best illustrate the differences between ADM/OD and SOD. This follows the logic of John Stuart Mill's method of agreement in his comparative case study methodology.[63] The two case studies used in this monograph are the Second Lebanon War in 2006 and Operation Odyssey Dawn in 2011.

Universe of Case Studies

Many case studies allow comparison of different design methodologies. To best evaluate design methodologies, a conflict must entail an environment that could be modelled as a complex system and preferably a hybrid threat. Successfully addressing such threats require a holistic approach to understand the problem. What is contemporarily defined as a hybrid threat has been in use throughout history. The Continental Army used regular and irregular units to combat the British during the American Revolution. The irregular militia had its roots with the first English settlements in North America in the 17th century that fought Native American populations on the frontier. Napoleon contended with a hybrid threat in Spain from 1808 to 1813 in the form of the British Army under Wellington supported by Spanish guerillas. The American Civil War saw the use of regular and irregular units on both sides. The Prussian Army fought large numbers of French partisans during the Franco-Prussian War of 1871 partially supported by the remnants of the regular French Army after Napoleon III surrendered.

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[63] Stephen van Evera, *Guide to Methods for Students of Political Science* (Ithaca, NY: Cornell University Press, 1997), 57.

In the 20th century, hybrid threats became more prevalent. The Japanese Army contended with the regular Army of Chiang Kai-shek in China and the irregular forces of the Communist Red Army in the 1930s and 1940s when Mao developed his theories about warfare. The US military likewise had to fight hybrid forces in the form of the North Korean Peaple's Army (NKPA) and Chinese Communist Forces (CCF) during the Korean War. The irregular Viet Cong and the regular North Vietnamese Army (NVA) worked in tandem to fight the US military during the Vietnam War. Though any of these historical examples could have been used for a case study, examples exist in the contemporary environment that are more relevant to a contemporary audience.

Clausewitz stated that historical examples "should be drawn from modern military history, insofar as it is properly known and evaluated."[64] The most recent examples of a hybrid threat include Russia's intervention in Crimea and eastern Ukraine. They also include the Islamic State's military forces operating in Iraq and Syria and the rival Kurdish forces that oppose them.

Selected case studies also required that one adversary had to employ one of the design methodologies. Though the Second Lebanon War fit both criteria – Hezbollah was characterized as a hybrid threat and that the IDF used SOD – it was difficult to find a second case study that replicated these requirements. The US in Operation Odyssey Dawn (OOD) used OD to inform detailed planning at the joint level. Though they did not face a hybrid threat in Libya, it was an environment that lent itself to systems theory and holistic thinking. Both candidates offer contingencies that a contemporary operational artist will likely confront on the modern battlefield. These factors make each of them good candidates for case studies.

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[64] Carl von Clausewitz, *On War*, ed. and trans. Michael Howard and Peter Paret (Princeton, NJ: Princeton University Press, 1976), 173.

Limitations

There were several limitations involved with this study that could affect the outcome of the case studies. It does not analyze the moral forces of training, quality of troops, and readiness. It also does not analyze national strength in terms of systems of finance, previous logistics arrangements, and strength of alliances. Despite these limitations, there is sufficient evidence available to account for the variables under scrutiny in the case studies.

Operationalization of Variables

The five independent variables used for study were command, logistics, intelligence, culture, and communication. Command's effectiveness is its ability to deal with uncertainty. The more occurrences a command dealt with uncertainty, the more effective it was. Logistics' effectiveness is the ability to provide resources to achieve its mission. The more occurrences that the logistics system failed to do so, the less effective it was. Intelligence's effectiveness is its ability to provide understanding about the enemy. The more occurrences that it missed something critical about the enemy, the less effective it was. Culture is measured either as holistic and dialectical thinking within a military, analytical and logical. If a military culture prefers holistic and dialectical thinking, it is more likely to use design methodologies effectively. Communication's effectiveness is its ability to clarify its ideas and concepts through socialization and learning. The fewer occurrences that a system has of poor understanding of what is being directed, the more effective it is.

## Case Study 1 – Second Lebanon War

In 1978, Israel first intervened in the Lebanese Civil War to secure its northern border.[65] It invaded a second time in 1982 in Operation Peace for Galilee to fight terrorist interventions

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[65] Gordon C. Griffith, *Israel Versus Hezbollah 2006: An Assessment of Israeli Strategy* (Montgomery, AL: Air University, 2008), 4.

into northern Israel. The IDF maintained an occupational presence to create a secure buffer zone

and destroy the Palestinian Liberation Organization (PLO).[66] Though the PLO never recovered in

Lebanon from these operations, the IDF created new problems with their continued presence. The

Shia terrorist organization Hezbollah was founded in 1985 in response to prolonged Israeli

occupation.[67] Its goals were to eliminate imperial power influence in Lebanon, obliterate Israel

and liberate Jerusalem, and establish an Islamic regime in Lebanon.[68] First acquiring the support

of Iran and Syria, Hezbollah later gained local Lebanese legitimacy in the 1990s by involving

itself in the political process and establishing health, religious, and charity organizations.[69] After

continued terrorist actions in northern Israel, the IDF launched operations Grapes of Wrath and

Accountability in 1993 using standoff firepower and precision guided munitions (PGMs) to target

both the civilian and Hezbollah infrastructure. Like the Second Lebanon War thirteen years later,

Israel intended to pressure the Lebanese government to disarm Hezbollah. This action did not

work. When Prime Minister Ehud Barak was elected in 1999 he removed the IDF from southern

Lebanon.[70] Israel ended its military occupation on May 24, 2000, in a disorderly fashion shaped

by Hezbollah to appear that they pushed the IDF out. It was viewed as an Israeli defeat

internationally.[71]

     In June 2000, the UN created The Blue Line with an interim force establishing the border

between Lebanon and Israel. This move intended to assist the Lebanese government secure

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[66] Matthews, 6.

[67] Matthews, 6.

[68] David E. Johnson, *Hard Fighting: Israel in Lebanon and Gaza* (Santa Monica, CA: RAND, 2011), 11.

[69] Griffith, 8-9.

[70] Matthews, 8-9.

[71] Matthews, 11.

southern Lebanon, however the Lebanese were too weak to provide any type of police force in the south. Additionally, Lebanon would not disarm Hezbollah who was already an effective governing and security force in the area.[72] Despite a UN Security Council Resolution in September 2004 that called for all militia to disarm, Hezbollah strengthened its position with the help of Iran and Syria and conducted terrorist operations against Israel. Sporadic confrontation between both sides continued over the next two years. The event that triggered the Second Lebanon War occurred on July 12, 2006, after Hezbollah kidnapped two IDF soldiers near the disputed Shebaa Farms area in the Golan Heights. Though such activities had occurred sporadically in the recent past, Israeli Prime Minister Ehud Olmert surprised Hezbollah by declaring the kidnappings an act of war and responding with military action.[73]

The Israeli government retaliated with air strikes the same day after announcing that it held the Lebanese government responsible for Hezbollah's actions. The Israeli's demanded the return of their captured soldiers. Hezbollah refused to release the hostages except to trade for three Hezbollah prisoners held by Israel.[74] Additionally, Lebanon's government was weak and unable to comply with the Israeli's demands even if it wanted to.[75] From the beginning, Israel's leaders did not make its objectives clear, and the IDF failed to provide them with sufficient options for military capabilities.[76] [77] This broke with Clausewitz's dictum that the statesman and the commander should first determine on what type of war they wish to embark.[78] The Winograd

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[72] Matthews, 15-16.

[73] Griffith, 10-11.

[74] Griffith, 11.

[75] Matthews, 15.

[76] Johnson, 72.

[77] US Joint Forces Command, "The Second Lebanon War: Three Perspectives" *Joint Forces Command* (Washington DC: Joint Center for Operational Analysis, 2008), 4.

[78] Clausewitz and Paret, 88.

Report also discussed this fact while assessing the conflict after the fact.[79] The action that the IDF initially took on the ground was limited raids into the immediate periphery and then see what happens.[80]

The tanks and armored personnel carriers of the IDF conducted limited operations in southern Lebanon on July 12, short of a full invasion.[81] Chief of the Israeli General Staff, General Dan Halutz, rejected a previous operational plan called Mey Malom that would have been a full force ground invasion in conjunction with an air campaign. It also involved calling up the Israeli reserves. His logic was to produce effects that would force Hezbollah out of southern Lebanon instead of destroying it outright.[82] This approach was similar to the one used by Israel during the Second Intifada in Gaza and the West Bank from 2000 to 2005. In that conflict, the point was not necessarily to gain victory as much as to shape the environment in the IDF's favor.[83] Even the creator of SOD, Shimon Naveh, stated that destroying all of the key targets would collapse Hezbollah as an organization.[84] This was a key idea that assumed that one could destroy the enemy without needing to invest the resources for a ground invasion. Though this approach seemed to work in Gaza and the West Bank, it did not work in Lebanon.[85]

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[79] Winograd Committee submits Interim Report, April 30, 2007, accessed February 20, 2016, http://www.mfa.gov.il/mfa/pressroom/2007/pages/winograd%20inquiry%20commission%20submits%20interim%20report%2030-apr-2007.aspx.

[80] Johnson, 58.

[81] Griffith, 12.

[82] Matthews, 36-37.

[83] Billmyer, 63.

[84] Matthews, 37.

[85] Billmyer, 70.

Israeli and Hezbollah forces traded rocket and artillery fire while Israel targeted

Hezbollah Katyusha rocket sites with the Israeli Air Force (IAF).[86] As a result, the IDF

abandoned their previous doctrine, used a haphazard operational concept, and suffered from

confusion that negatively affected operations.[87] The first two days shaped the remainder of the

conflict.[88]

From July 12 to 31, 2006 Israel conducted limited border raids using commandos and

reconnaissance.[89] Israeli Prime Minister Ehud Olmert finally announced Israel's objectives on

July 17. These included the release of the Israeli soldiers, a ceasefire with Hezbollah and their

subsequent withdrawal from the border, a Lebanese Army presence to keep the peace, and the

abolishment of Hezbollah as a military power.[90] The IDF fought with small teams of infantry

supported by armor and encountered extensive fortified Hezbollah positions supplemented by

anti-tank guided missiles (ATGM). Hezbollah used well prepared defenses and spread themselves

among the population. They had been fortifying the area since 2000.[91] Hezbollah knew the terrain

very well and had built an efficient logistics system. Their defenses were located both above and

under the ground and included a series of tunnels.[92] Though the IDF expected an irregular fight

Hezbollah fought closer to a conventional style. The extended duration of firefights, the tenacity

of the defenders to hold their ground, possible incidence of counterattack, presence of harassing

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[86] Griffith, 12.

[87] Johnson, 73.

[88] Griffith, 13.

[89] Griffith, 18.

[90] Matthews, 38.

[91] David Makovsky and Jeffrey White, *Lessons and Implications of the Israeli Hezbollah War* (Washington DC: The Washington Institute for Near East Study, 2006), 35.

[92] Griffith, 18.

fires, limited mingling of Hezbollah fighters and civilians, and the presence of uniforms all suggested that Hezbollah was fighting in a more conventional way.[93] Though Hezbollah conducted strategic rocket attacks against Israeli population centers, Israel largely neutralized these extended range rockets in the early hours of the campaign. It was the short range Katyushas that were difficult for the IAF to counter.[94] Israel slowly began to realize that the effects-seeking strategy they had pursued was not working and considered planning for a ground invasion. The government called up the reserves on 21 July.[95]

Between July 31 and August 10, the IDF committed larger forces to the conflict in the form of five brigades that moved into Lebanon to block the Syrian border and cut off Hezbollah fighters. By August 5, the IDF was only four miles inside Lebanon. Confusing orders, poorly trained reserves, and an aversion to casualties all contributed to this dynamic.[96] The objective was to "disrupt the logic of the enemy," not to destroy every rocket site.[97] Due to their actions, the rocket attacks stopped temporarily, but only with great IDF losses. This offensive failed to eliminate Hezbollah from southern Lebanon and the rocket attacks continued.[98]

From August 10 to 14, the IDF maneuvered to the northern limit of their advance on the Litani River and surrounded Hezbollah forces by August 13. On August 11, the United Nations Security Council (UNSC) approved Resolution 1701 that would go into effect on August 14. It called for an immediate end to hostilities, a joint Lebanese-UN force to maintain order as the IDF

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[93] Stephen Biddle and Jeffrey A. Friedman, *The 2006 Lebanon Campaign and the Future of Warfare: Implications for Army and Defense Policy* (Carlisle, PA: Strategic Studies Institute, 2008), 34.

[94] Makovsky and White, 48.

[95] Matthews, 43.

[96] Matthews, 49-50.

[97] Matthews, 45.

[98] Griffith, 19.

withdrew, elimination of all unauthorized weapons, and a permanent peace settlement between Israel and Lebanon.[99] During Operation Changing Direction, the IDF conducted the largest ground offensive of the war with four divisions from August 11 to 13.[100] The IDF hoped to create favorable conditions for Israel by pushing to the Litani River and reduce the rocket fire on Israel.[101] Though it eventually surrounded the majority of Hezbollah fighters in southern Lebanon, the offensive did not eliminate Hezbollah or deal with the rockets.[102] Meanwhile both sides continued to engage each other in heavy combat to gain a better advantage before the ceasefire took effect.[103] The war officially ended on August 14, 2006.[104]

Command

The more occurrences that that a command system can successfully deal with uncertainty, the more utility it has. Based in part on the Winograd Report, the IDF failed to adapt to the situation at hand and did not authorize operations that would achieve military objectives.[105] Many IDF commanders remained in their headquarters rather than leading out front to assess the situation at hand as required by a more conventional threat with a high tempo.[106] The Israeli command's tactical decisions restricted their flexibility rather than those of the enemy. They also

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[99] Griffith, 25.

[100] Johnson, 73.

[101] Johnson, 71-3.

[102] Matthews, 52.

[103] Griffith, 19.

[104] Matthews, 52.

[105] Winograd Committee, accessed 20 February, 2016, http://www.mfa.gov.il/mfa/ pressroom/2007/pages/winograd%20inquiry%20commission%20submits%20interim%20report% 2030-apr-2007.aspx.

[106] US Joint Forces Command, 8.

failed to learn and adapt from their experience.[107] Uncertainty is a continuous facet of warfare,

and was present within the Israeli command climate during the Second Lebanese War.[108] Though

no military is immune from the failures of political direction, command, and execution, the SOD

methodology seemed to be a disadvantage when dealing with the complexity of the Second

Lebanon War.[109] With a large intelligence requirement and limited time to act on it, the best

methodology for such an environment would account for a more conventional fight. As the fight

becomes more conventional, this dynamic becomes even more important. In this case, SOD was a

disadvantage and weak in its utility.

Logistics

     Logistics should be evaluated based on its ability to help bring resources to support the

mission. There was a perception in Israel that there were supply issues especially among the

reserves during the Second Lebanese War.[110] Issues included a lack of vests, medical equipment,

radios, ammunition, night vision devices (NVD), and food and water for the reserves.[111]

However, these issues reflected prewar decisions about the budget and distribution issues within

Lebanon once the conflict initiated.[112] Though there wasn't a comprehensive failure of logistics

during the war, the US did resupply Israeli PGMs near the end of the conflict.[113] It is unknown

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     [107] Anthony H. Cordesman, *Preliminary Lessons of the Israeli-Hezbollah War*,
(Washington DC: Center for Strategic and International Studies, 2006), 6.

     [108] Makovsky and White, 49.

     [109] Makovsky and White, 35.

     [110] Makovsky and White, 42.

     [111] Matthews, 50.

     [112] Makovsky and White, 55.

     [113] Matthews, 45.

whether Israel relied on using these expensive munitions for the long run, but given the lack of planning displayed earlier in the campaign, it is likely. Though this resupply was necessary, it did not have an overall negative effect on the effectiveness of troops on the battlefield based on the particular design methodology used. The logistics system was adequate for the mission at hand.

Intelligence

        Effective intelligence is the ability to understand the enemy. Israel had difficulties with this dynamic during the war. Though the IDF's ground commanders and intelligence professionals understood the enemy's capabilities, they failed to react appropriately to some of these threats. They understood Hezbollah's capabilities in terms of missiles, Unmanned Aerial Vehicles (UAVs), high volumes of supply deliveries before and during the war, sniper rifles, NVDs, and communications equipment.[114] However, they failed to react appropriately to some threats. Especially disappointing was their response to the short-range rocket threat and how to end it. Either intelligence professionals did not inform their command or were unconvincing doing so.[115] Another issue was that the quantity of intelligence was less available in Lebanon than in Gaza and the West Bank where SOD had been used more successfully.[116] Israeli intelligence has also been criticized for not understanding the culture of Hezbollah and that of the Lebanese government and people who reacted differently than the Israelis expected.[117] In sum, the IDF intelligence was a weakness during the campaign.

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[114] Cordesman, 16.

[115] Makovsky and White, 51.

[116] Johnson, 43.

[117] Makovsky and White, 50.

Culture

Cultures that are holistic and dialectical in their thinking are more suited for design methodologies. Unfortunately, the IDF's culture was characterized as more logical and analytical. This meant that it was at a disadvantage in general when incorporating methodologies preferable to holistic thinking such as those involving design. The IDF also had difficulty changing its thinking quickly to adapt to a different context than had been anticipated. Something as complex as SOD was difficult to incorporate effectively into the IDF.[118] Though SOD was more effective during the Second Intifada, they IDF lacked sufficient time and the ability to gather the necessary understanding about the enemy in Lebanon. Unfortunately for the IDF, it was largely focused on its previous conflict and assumed that the enemy could be paralyzed with PGMs and that little ground force was necessary.[119] The Israeli's incorrectly pursued effects as an end in and of themselves rather than viewing them as a shaping operation for a conventional fight.[120] They believed that they could therefore achieve the destruction of the enemy cognitively instead of through attrition. In the Second Lebanon War, this belief proved insufficient in a conventional context. When it employed this strategy, the IDF did so in half-measures, thus making matters worse.[121] The IDF's organizational culture led to an incomplete operational concept resulting in negative effects during the Second Lebanon War.[122]

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[118] Billmyer, 57.

[119] Matthews, 24.

[120] Johnson, 34.

[121] Billmyer, 73.

[122] Billmyer, 86.

Communication

Communication is the ability to disseminate information quickly and make oneself understood to one's subordinates. The biggest weakness for the IDF was the difficulty communicating from the senior level to the junior one. Over-intellectualized concepts confused the planners.[123] There was a lack of concise language and this complex language was a continuing issue during the war.[124] The commanders on the ground didn't have the time to understand the academic background behind the SOD methodology. Though it was supposed to be limited to higher headquarters, SOD's language still migrated into lower echelons causing confusion.[125] Though it was successful against low intensity conflict (LIC), it is a weak methodology if it cannot be understood within the larger organization.[126] Communication was a significant weakness of SOD in this situation.

Summary

The IDF's command system had some shortcomings when applied to the Second Lebanon War. The command structure was ineffective at changing its operations and recognizing that its original assumptions were incorrect. It failed to learn or adapt sufficiently or quickly enough to be effective, creating a weakness during the conflict. The IDF logistics prepared for a short war. Though they had some localized shortcomings, the IDF logistics proved sufficient for the conflict at hand. Though it understood enemy capabilities well, the intelligence system either did not understand the new nature of the enemy it faced or failed to convince the IDF command

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[123] US Joint Forces Command, 4.

[124] Johnson, 88.

[125] Matthews, 25-7.

[126] Matthews, 64.

of this characterization. The IDF's culture was not one that lent itself to holistic or dialectical thinking that is conducive to adopting a design methodology. Finally, there were significant gaps in the IDF's ability to communicate effectively to subordinate commands. Though SOD's concepts were not necessarily supposed to migrate to the lower levels, the incomplete understanding of its ideas at higher echelons made it a significant weakness when directing subordinate units. Overall, SOD did not work well in this context.

## Case Study 2 – Operation Odyssey Dawn

The US involvement in OOD against Libyan President Muammar Qaddafi's forces originated in 2010 with the Arab Spring pro-democracy uprisings in the Middle East. Many native Libyans characterized Qaddafi's authoritarian government as corrupt, unequal, and one of limited opportunity. Its people revolted in the wake of other Arab Spring protests in neighboring countries like Tunisia and Egypt. President Mubarak of Egypt was forced to step down on February 11 and this specific action may have motivated the subsequent Libyan revolt.[127] One such revolt occurred near Libya's government courthouse in Benghazi on February 15, 2011. The Libyan government imprisoned Fathi Tabil, a human rights lawyer, earlier in the day. Protestors gathered again during the following two days while police and soldiers used increasingly coercive methods to disperse the crowds. On February 17 the protesters organized a "day of rage" in Benghazi. Police and soldiers responded using machine guns that caused many deaths.[128] Later in the day, the protestors gained access to local armories using bulldozers loaded with dynamite.[129]

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[127] Karl Mueller, ed., *Precision and Purpose: Airpower in the Libyan Civil War* (Santa Monica, CA: RAND, 2015), 11.

[128] Christopher Chivvis, *Toppling Qaddafi: Libya and the Limits of Liberal Intervention* (New York: Cambridge University Press, 2014), 23, 25.

[129] Varun Vira and Anthony H. Cordesman, *The Libyan Uprising: An Uncertain Trajectory* (Washington DC: Center for Strategic and International Studies, 2011), 10.

The protestors expelled government forces from Benghazi and took control of the entire city within a few days.[130] What started as a protest became a rebellion and fighting between the rebels and Qaddafi's forces ensued.

The international community condemned Qaddafi's repressive actions. After securing their own citizens on February 26, the United Kingdom (UK) and France sponsored UNSCR 1970 that called for a ceasefire and arms embargo against his regime.[131] The National Transition Council (NTC) formed the next day.[132] Regime defectors, representatives from key tribes, former prisoners, human rights activists, lawyers, intellectuals, and Libyan expatriates composed the NTC. Eventually it claimed to be the sole representative body of the Libyan people and gained international recognition.[133] President Obama believed that Qaddafi needed to relinquish power and supported measures including UNSCR 1970 to reach this aim.[134] The UN approved UNSCR 1970 on February 27 and established an arms embargo, placed a travel ban on regime officials, froze regime assets abroad, and referred Qaddafi to the International Criminal Court (ICC).[135]

The United States designated Africa Command (AFRICOM) to prepare for Non-combatant Evacuation Operations (NEO). Eventually, AFRICOM established Joint Task Force Odyssey Dawn (JTF-OD) to command and control US operations in Libya on March 3.[136]

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[130] Chivvis, 25.

[131] Patricia A. Weitsman, *Waging War: Alliances, Coalitions, and Institutions of Interstate Violence* (Stanford, CA: Stanford University Press, 2014), 164.

[132] Richard A. Goodman, "Operations Odyssey Dawn and Unified Protector: A Coercive Failure?" (monograph US Army Command and General Staff College, 2012), 21.

[133] Chivvis, 32.

[134] Jeremiah Gertler, *Operation Odyssey Dawn (Libya): Background and Issues for Congress*, Congressional Research Institute (Washington DC: Government Printing Office, 18 March, 2011), 1.

[135] Chivvis, 30.

[136] James, Holcomb, and Mansky, 24.

Initially, the JTF was responsible for conducting humanitarian assistance (HA), moving Tunisian

refugees to Egypt, and enforcing the provisions of UNSCR 1970.[137]

On March 10, Qaddafi's forces recaptured the key town of Ras Lanuf and advanced to

Benghazi, threatening to destroy the NTC.[138] This development informed President Obama's

decision to sponsor a new UN Resolution to acquire the legal backing for military means to force

Qaddafi out of power.[139] The factors that most mattered in this decision were the imminent threat

of Qaddafi's troops and the emergence of a military option that could protect the civilians.[140] This

response was in part informed by previous events from Egypt and Tunisia before understanding

whether the rebels would be able to topple Qaddafi.[141] Additionally, Libyan instability threatened

the US interests of regional stability, energy stability, and universal human values.[142] After an

emergency session of the UNSC, UNSCR 1973 passed on March 17 and mandated a ceasefire,

broad measures to end violence against civilians, a mandate for military action, a no-fly zone, and

extended arms embargo. However, the resolution ruled out an occupying force.[143] [144] Air

operations began two days later.

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[137] Joe Quartarario Sr., Michael Rovenolt, and Randy White, "Libya's Odyssey Dawn: Command and Control," *Prism*, vol. 3, issue no. 2, (March 2012): 144.

[138] Vira and Cordesman, 10.

[139] Chivvis, 53.

[140] Mueller, 21.

[141] Anthony Bell and David Witter, *The Libyan Revolution Part 2: Escalation and Intervention* (Washington DC: Institute for the Study of War, 2011), 13.

[142] Kevin Marsh, "Leading from Behind: Neoclassical Realism and Operation Odyssey Dawn," *Defense & Security Analysis*, vol. 30, no. 2 (2014): 125-126.

[143] Weitsman, 164.

[144] Chivvis, 60-61.

Africa Command took over responsibility for forming the coalition, acquiring military

contributions, and gaining agreements for basing.[145] This placed an abnormal burden on

AFRICOM because it was designated primarily to assist African nations in training their military

forces, not participate in major combat operations.[146] JTF-OD had to complete an accelerated

version of JOPP including OD as the situation developed.[147] AFRICOM's goals were to protect

civilians, prevent mass attacks against communities, and deter mass atrocities. The UNSCR 1973

and AFRICOM's military objectives provided the framework for future operations in Libya.[148]

Operations began on March 19 when the French targeted Benghazi with aircraft strikes

and the United States targeted Libyan command and control nodes with Tomahawk cruise

missiles.[149] These initial strikes set the conditions to enforce the no fly zone requirement of

UNSCR 1973.[150] Over the next few days, the coalition destroyed Libyan air defenses, airfields,

communications nodes, surface to air missile sites (SAM), and eventually ground forces. The

Libyan Air Force was effectively destroyed on March 25 and the US subsequently escalated the

conflict by introducing AC-130 Specter and A-10 Thunderbolt ground attack aircraft into theater

to directly support the NTC and its forces.[151] Coalition airstrikes targeted and destroyed Libya's

air defense network, military installations, halting Qaddafi's forces.[152] On March 31, The North

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[145] Weitsman, 165.

[146] Chivvis, 87.

[147] James, Holcomb, and Mansky, 25.

[148] Goodman, 25-26.

[149] "New Air Missions Target Kadhafi Troops: Pentagon," *Agence France-Presse*, March 28, 2011, accessed March 24, 2016, http://www.activistpost.com/2011/03/new-air-missions-attack-kadhafi-troops.html.

[150] Gertler, 7.

[151] "New Air Missions Target Kadhafi Troops."

[152] Vira and Cordesman, 11.

Atlantic Treaty Organization (NATO) assumed full control of operations from JTF-OD under Operation Unified Protector (OUP) and the last US strike mission occurred on April 5.[153] [154]

Command

Command's effectiveness depends on the number of occurrences that it can deal with uncertainty. Africa Command faced several challenges. Founded in 2008, AFRICOM was a relatively new combatant command (COCOM) and had no previous experience forming a coalition or coordinating activities across geographic boundaries. AFRICOM had to coordinate operations with US European Command (EUCOM), US Central Command (CENTCOM), US Transportation Command (TRANSCOM), and US Strategic Command (STRATCOM).[155] It was insufficiently staffed with planners and analysts at the beginning of operations.[156] Additionally, it was composed of individuals who had not worked together before, but the depth of experience and training mitigated this issue.[157] The AFRICOM Commander, General Carter Ham, only assumed command on March 9.[158] There were also issues concerning bandwidth for the communication architecture that impeded information distribution.[159]

The US mission in Libya was to enforce the embargo, protect civilians from the regime, destroy key elements of the Libyan air defenses, and enforce the no-fly zone.[160] Despite receiving

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[153] Weitsman, 167.

[154] Vira and Cordesman, 49.

[155] Quartarario, Rovenolt, and White, 144, 146.

[156] Quartarario, Rovenolt, and White, 151.

[157] Weitsman, 180.

[158] Gertler, 14.

[159] Quartarario, Rovenolt, and White, 154.

[160] Weitsman, 180.

confusing guidance from the Department of Defense (DOD), the command was able to remain flexible in the face of uncertainty.[161] The US planned for and moved forces into the region soon after the uprising on February 17.[162] The staff successfully switched planning from NEO to HA and later to combat operations.[163] Additionally, there was no integrated coalition command structure during OOD because of its hasty formation.[164] However, the member states successfully coordinated with JTF-OD to achieve mission success.

Despite the challenges, AFRICOM led a coalition of fifteen nations, established a JTF, planned and executed operations, and transferred the operation to NATO. It leveraged other command support when it fell short of capabilities or resources.[165] From the beginning, other coalition members nested under US guidance.[166] Most Libyan air, air defense, and naval assets were destroyed in the first stage of US and European attacks.[167] The US structure enabled a sufficient solution and fostered a rapid response to the humanitarian crisis.[168] Ultimately, AFRICOM's command structure was successful during OOD.

Logistics

Logistics is measured based on its ability to bring resources to support operations. The more occurrences that a logistics system fails to provide sufficient resources to a situation, the

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[161] James, Holcomb, and Mansky, 26.

[162] Bell and Witter, 18.

[163] Quartarario, Rovenolt, and White, 149.

[164] Bell and Witter, 24.

[165] Quartarario, Rovenolt, and White, 155.

[166] Goodman, 25.

[167] Vira and Cordesman, 18.

[168] Weitsman, 169.

less effective it is. OOD developed very quickly and involved dynamic staff structures that complicated logistics planning.[169] AFRICOM had limited logistics resources of its own and fulfilled its logistics requirements by using EUCOM as the primary provider based on its established systems and relationships. It also used TRANSCOM to provide tanker support to maintain the operation.[170] During initial operations, AFRICOM and EUCOM used existing logistics management capabilities.[171]

One issue involved interoperability when European stockpiles of PGMs waned. The United States was ready to backfill these shortfalls, but its PGMs did not fit French and UK aircraft.[172] Though it was successful providing air refueling, the United States fell short with munition replenishment.[173] This shortage is somewhat surprising given the emphasis on interoperability between NATO systems. Despite this shortfall, AFRICOM's logistics system was sufficiently flexible to provide the resources to support mission success before transferring responsibility of the mission to NATO.

Intelligence

Intelligence effectiveness is based on its ability to understand the enemy. The more occurrences that an intelligence system is able to deal with uncertainty about the enemy, the greater its effectiveness. There was little intelligence about the supported forces within the NTC when OOD began. This included how unified the rebels were, how they were organized, and if

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[169] Brown and Coryell, 74.

[170] Quartarario, Rovenolt, and White, 147, 148.

[171] Brown and Coryell, 74.

[172] Weitsman, 170.

[173] Weitsman, 180.

there were any links to extremist organizations like al-Qaeda (AQ).[174] Deputy National Security

Advisor John Brennan expressed concern that in addition to not understanding the rebels, Qaddafi

could respond with terror attacks against the US as he had done in the past.[175] This was

compounded because there was no joint forces land component command in direct contact with

the rebels or fighting Qaddafi's forces that could satisfy the usual intelligence requirements.[176]

That said, knowledge about Qaddafi's forces seemed relatively good as demonstrated by

the destruction of his air force. US and allied forces degraded Qaddafi's air and command and

control (C2) systems, and halted the regime assault on Benghazi within ten days.[177] JTF-OD's

intelligence cell partially bolstered their collection using social media sites such as Facebook and

Twitter. Such methods provided situational awareness to the JTF without the benefit of a land

component.[178] Though lacking perfect clarity, the intelligence provided sufficient knowledge

about the enemy to stop Qaddafi and protect Libyan civilians.

Though sufficient, intelligence is never perfect and incidents occurred where insufficient

intelligence led to air strikes that accidentally hit rebel forces. These mistakes were possible

because of rebel inexperience, non-linear advances, and unpredictability.[179] There were also

issues with releasing information to allies and insufficient bandwidth capacity that constrained

intelligence sharing among the coalition.[180] Delays averaged two to three days due to US

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[174] Chivvis, 45.

[175] Bell and Witter, 17.

[176] James G. Foggo III and Michael Beer, "The New Operational Paradigm: Operation Odyssey Dawn and the Maritime Operations Center," *Joint Forces Quarterly*, issue no. 70, (3rd Quarter 2013): 93.

[177] Chivvis, 93.

[178] Foggo and Beer, 93.

[179] Weitsman, 169, 170.

[180] Weitsman, 171.

classification procedures.[181] Eventually, the Naval Computer and Telecommunications Station (NCTS) provided an ad hoc common base for information sharing among the coalition.[182] In total, the intelligence system was sufficient to enable AFRICOM's mission success during OOD.

Culture

Cultures that are holistic and dialectical in their thinking are more suited to design. The United States is characterized by an analytical and logical culture, and this is a disadvantage when understanding and using OD. However, this did not seem to be a significant disadvantage when applying OD. Though there was some initial confusion about the nature of the mission, who was supporting whom, and what the actual objectives were, these challenges were overcome well before the mission was handed to NATO.[183] Though its culture did not lend itself to holistic and dialectical thinking, AFRICOM was able to overcome this handicap.

Communication

Communication is the ability to disseminate information quickly and make oneself understood to one's subordinates. The fewer occurrences that a system has of poor communication, the more effective it is. Though it had initial difficulty translating political objectives to military objectives, there were no significant communications issues.[184] The institutionalization of US doctrine enabled AFRICOM to adapt flexibly despite organizational issues at the beginning of operations.[185] This doctrine proved essential for operating with other

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[181] Quartarario, Rovenolt, and White, 152.

[182] Weitsman, 171.

[183] Chivvis, 87.

[184] Quartarario, Rovenolt, and White, 150.

[185] Weitsman, 169.

COCOMs and with US allies. Years of previous joint exercises, training, and education enhanced the JTF's performance during both planning and execution. Additionally, the clear understanding from which to plan enabled mission success and the transition to NATO[186] The ability to integrate effectively more than anything else demonstrated OD's communication and socialization success during OOD.

Summary

Operational Design in this context offered an advantage over SOD. Despite the challenges of limited personnel, an unfamiliar mission, and the relative newness of the COCOM, AFRICOM's command overcame these challenges. It effectively coordinated operations across several COCOMs and fifteen other nations. It was a strength during OOD. The logistics system was sufficient to enable mission success. Though there was limited knowledge on the supported forces, it had sufficient knowledge of Libyan regime forces to achieve mission success. Additionally, the US overcame its logical and analytic culture to successfully use OD during OOD. Finally, AFRICOM demonstrated the success of communicating across the COCOMs and among allies. The use of OD enabled success during OOD.

## Conclusion

In conclusion, there is evidence that Operational Design offers several advantages over Systemic Operational Design. Though no command systems can overcome the failures of political direction, there were issues that the IDF was unable to overcome that did not keep JTF-OD from completing its mission. That said, Operational Design offered an advantage over Systemic Operational Design with respect to the command variable. The IDF were unable to adapt to the situation they were confronted with and seemed unable to learn from the situation at

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[186] James, Holcomb, and Mansky, 27.

hand. In contrast, JTF-OD successfully attained mission success despite the unfamiliar nature of the mission and limited personnel assigned to it. Though they were a relatively new command, AFRICOM adapted quickly to a deteriorating situation and succeeded in neutralizing the Libyan air defenses, Libyan air force, and halted the ground offensive threatening Benghazi. By halting the Libyan offensive, they likely ensured the NTC's survival. JTF-OD's command system was superior to that of the IDF in this instance.

With respect to logistics, both systems appeared adequate for their respective missions. Despite some setbacks, logistics did not negatively impact the IDF overall in its operations in Lebanon. For JTF-OD, logistics were renounced from other COCOMs and effectively used to support mission success. This was a strength of the US logistics system in its flexibility to resource and provide logistics support where needed. Both had issues with PGM resupply. The IDF requested and acquired from the US. Additionally, PGMs were in short supply with European partners during Operations Odyssey Dawn. Though both systems were adequate for their respective missions, neither seemed to offer an advantage over the other.

In terms of intelligence, JTF-OD's system was superior to that of the IDF. The IDF had difficulty fully understanding Hezbollah during the war. Though it understood Hezbollah's capabilities in terms of equipment, it failed to identify or transmit the short-range rocket threat. IDF's systems overreliance on intelligence was a disadvantage for them and it never silenced the short range rocket threat. In contrast, limited intelligence did not limit JTF-OD's mission success. The knowledge of the enemy and the supported forces did not significantly impede mission success. Within ten days, the JTF had destroyed the Libyan air force, destroyed Libyan air defense systems, and halted the offensive against Benghazi, thus protecting the civilian population and fulfilling its mission. Lack of intelligence is inherent in war, but JTF-OD's system was superior to the IDF's.

Both the IDF's and JTF-OD's cultures were logical and analytical cultures that should have been a handicap to holistic methodologies like Systemic Operational Design and

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Operational Design. Though both of these military cultures had this disadvantage, the IDF misapplied this thinking by drawing incorrect conclusions about the nature of war that put them at a disadvantage when confronting a threat like Hezbollah. On the other hand, JTF-OD overcame its cultural disadvantages and effectively met its mission objectives. Cultural proclivities did not seriously degrade its mission success.

For communications, JTF-OD had more success than the IDF. The IDF had significant difficulty with communication during the Second Lebanon War. The difficulty in disseminating understandable information from higher to lower echelons was a weakness. In contrast, this difficulty was not apparent with JTF-OD. The biggest issue was translating political objectives into military goals. The institutionalization of US doctrine and its ability to be easily understood was a strength. In contrast to Systemic Operational Design, Operational Design did not require knowledge of unfamiliar vocabulary or overly complex ideas to be effective. The IDF had over ten years to socialize the ideas and education required by Systemic Operational Design to the necessary people. In contrast, Operational Design only existed in US doctrine since 2006, five years. In this case, the ease of educating and communicating the ideas required by Operational Design was superior to Systemic Operational Design.

In conclusion, based on its advantage of command, intelligence, and communication, there is evidence that Operational Design has more practical utility than Systemic Operational Design. Though there may be some circumstances where SOD may be preferred, these conditions did not exist in the Second Lebanon War. The ability to accomplish the mission in an environment of uncertainty is a preferred system characteristic for both command and intelligence. In terms of communication, the ability to translate higher concepts into language and ideas that subordinate echelons can understand is another preferable system attribute. It is these attributes that suggest Operational Design has advantages over Systemic Operational Design.

**Bibliography**

Adamsky, Dima. *The Culture of Military Innovation*. Stanford, CA: Stanford University Press, 2010.

Army Techniques Publication 5-0.1. *Army Design Methodology*. Washington, DC: Government Printing Office, 2015.

Axelrod, Robert and Michael D. Cohen. *Harnessing Complexity.* New York: Basic Books, 2000.

Bell, Anthony and David Witter. *The Libyan Revolution Part 2: Escalation and Intervention*. Washington DC: Institute for the Study of War, 2011.

Biddle, Stephen and Jeffrey Friedman. The 2006 Lebanon Campaign and the Future of Warfare: Implications for Army and Defense Policy. Carlisle, PA: Strategic Studies Institute, 2008.

Billmyer, John R. "The IDF: Tactical Success – Strategic Failure, SOD, the Second Intifada and Beyond." Monograph, US Army Command and General Staff College, 2011.

Brown, W.A. and Brent Coryell. "Logistics Support Seams During Operation Odyssey Dawn and Unified Protector." *Joint Forces Quarterly*, issue 68, (1st Quarter 2013): 73-77.

Chivvis, Christopher. *Toppling Qaddafi: Libya and the Limits of Liberal Intervention*. New York: Cambridge University Press, 2014.

Clausewitz, Carl von. *On War.* Edited and Translated by Michael Howard and Peter Paret. Princeton, NJ: Princeton University Press, 1976).

Cordesman, Anthony H. *Preliminary Lessons of the Israeli-Hezbollah War.* Washington DC: Center for Strategic and International Studies, 2006.

Foggo, James G. III and Michael Beer. "The New Operational Paradigm: Operation Odyssey Dawn and the Maritime Operations Center." *Joint Forces Quarterly*, issue 70, (3rd Quarter 2013): 91-93.

Gertler, Jeremiah. *Operation Odyssey Dawn (Libya): Background and Issues for Congress*. Congressional Research Institute. Washington DC: Government Printing Office, March 18, 2011.

Goodman, Richard A. "Operations Odyssey Dawn and Unified Protector: A Coercive Failure?" Monograph, US Army Command and General Staff College, 2012.

Griffith, Gordon C. Israel Versus Hezbollah 2006: An Assessment of Israeli Strategy. Montgomery, AL: Air University, 2008.

James, Gregory K., Larry Holcomb, and Chad T. Manske. "Joint Task Force Odyssey Dawn: A Model for Joint Experience, Training, and Education." *Joint Forces Quarterly*. issue 64, (2nd Quarter 2012): 24-29.

Joes, Anthony James. *Resisting Rebellion: The History and Politics of Counterinsurgency*. Lexington, KY: The University of Kentucky, 2004.

Johnson, David E. *Hard Fighting: Israel in Lebanon and Gaza.* Santa Monica, CA: Rand Corporation, 2011.

Joint Publication 5-0. *Joint Operation Planning*. Washington DC: Government Printing Office, 2011.

Keegan, John R. *Intelligence in War*. New York: Vintage Books, 2004.

Makovsky, David and Jeffrey White. *Lessons and Implications of the Israeli Hezbollah War*. Washington DC: The Washington Institute for Near East Study, 2006.

Marsh, Kevin. "Leading from Behind: Neoclassical Realism and Operation Odyssey Dawn." *Defense & Security Analysis*, vol. 30, no. 2 (2014): 120-132.

Matthews, Matt M. *We Were Caught Unprepared: The 2006 Hezbollah-Israeli War.* Fort Leavenworth, KS: Combat Studies Institute Press, 2008.

Mueller, Karl, ed. *Precision and Purpose: Airpower in the Libyan Civil War*. Santa Monica, CA: RAND, 2015.

Naveh, Shimon. *Operational Art and the IDF: A Critical Study of a Command Culture*. Washington DC: Center for Strategic and Budgetary Assessment, 2007.

"New Air Missions Target Kadhafi Troops: Pentagon." *Agence France-Presse*. March 28, 2011. Accessed March 24, 2016. http://www.activistpost.com/2011/03/new-air-missions-attack-kadhafi-troops.html.

Quartarario, Joe Sr., Michael Rovenolt, and Randy White. "Libya's Odyssey Dawn: Command and Control." *Prism*, vol. 3, issue no. 2, (March 2012): 141-156.

Ryan, Alex, et al. *Art of Design.* Student Text Verson 2.0, US Army Command and General Staff College, 2010.

Shrader, Charles R. *The Withered Vine: Logistics and the Communist Insurgency in Greece, 1945-1949*. Westport, CT: Praeger, 1999.

Sorrells, Lieutenant Colonel William T., et al. "*Systemic Operational Design: An Introduction.*" Monograph, US Army Command and General Staff College, 2005.

Tse-Tung, Mao. *Selected Writings of Mao Tse-Tung*. Peking, China: Foreign Language Press, 1967.

US Joint Forces Command. "The Second Lebanon War: Three Perspectives." Joint Forces Command. Washington DC: Joint Center for Operational Analysis, 2008.

van Creveld, Martin. *Command in War*. Cambridge, MA: Harvard University Press, 1985.

_____. *Supplying War*. Cambridge, UK: Cambridge University Press, 2004.

van Evera, Stephen. *Guide to Methods for Students of Political Science*. Ithaca, NY: Cornell University Press, 1997.

Vira, Varun and Anthony H. Cordesman. *The Libyan Uprising: An Uncertain Trajectory*. Washington DC: Center for Strategic and International Studies, 2011.

Weitsman, Patricia A. *Waging War: Alliances, Coalitions, and Institutions of Interstate Violence*. Stanford, CA: Stanford University Press, 2014.

Weizman, Eyal. "Lethal Theory." Open! Platform for Art, Culture & the Public Domain. November 1, 2009. Accessed January 28, 2016. www.onlineopen.org/lethal-theory.

"Winograd Committee submits Interim Report." April 30, 2007. Accessed February 20, 2016. http://www.mfa.gov.il/mfa/pressroom/2007/pages/winograd%20inquiry%20commission %20submits%20interim%20report%2030-apr-2007.aspx.